

WE CLAIM:

1. In a gas generator comprising a nitrogen-containing nonazide gas generant composition having a fuel and an oxygen-containing oxidizer, wherein the gas generant is extruded into a desirable shape and upon combustion yields gases comprising NO_x gas, the improvement comprising:

a selective non-catalytic reducing compound selected from the group consisting of ammonium salts, amines, amides, and imides, wherein the reducing compound contains at least one mole of elemental nitrogen per one mole of NO_x produced by the gas generating mixture upon combustion, and is discretely interspersed about the gas generating composition in heterogeneous relation thereto.

2. In a gas generator comprising a pyrotechnic gas generating mixture, said pyrotechnic gas generating mixture comprising at least one material of each of the following functional groups of materials - a) a fuel selected from the group of azole compounds consisting of triazole, aminotetrazole, tetrazole, bitetrazole, and metal salts of these compounds; b) an oxygen containing oxidizer compound selected from the group consisting of alkali metal, alkaline earth metal, lanthanide and ammonium nitrates and perchlorates or from the group consisting of alkali metal and alkaline earth metal chlorates and peroxides; and c) a low-temperature slag forming material which is sufficient in amount during combustion to cause the solid combustion particles to coalesce into easily filterable slag or clinkers but not so much as to make a low viscosity liquid, selected from the group consisting of silicon dioxide, boric oxide and vanadium pentoxide or from the group consisting of alkali metal silicates, borates, and carbonates or from the group consisting of naturally occurring clays and talcs, wherein the gas generating mixture is extruded into a

desirable shape and combusts to yield gases comprising NO_x gases, the improvement comprising:

5 a selective non-catalytic reducing compound selected from the group consisting of ammonium salts, amines, amides, and imides, wherein the reducing compound contains at least one mole of elemental nitrogen per one mole of NO_x produced by the gas generating mixture upon combustion, and is interspersed about the gas generating mixture in heterogeneous relation thereto.

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10 3. A vehicle occupant restraint system comprising:

an inflatable air bag;

a gas generator;

15 an extruded nitrogen-containing gas generant composition within said gas generator;

a selective non-catalytic reducing compound placed within said gas generator in heterogeneous relation to said gas generant composition, wherein said selective non-catalytic reducing compound is selected from the group consisting of ammonium salts, amides, imides, or amine-containing compounds.

20 4. A vehicle occupant restraint system of Claim 3 wherein:

25 said ammonium salt is selected from the group consisting of ammonium carbonate ((NH₄)₂CO₃), ammonium sulfate ((NH₄)₂SO₄), ammonium chloride (NH₄Cl), ammonium carbamate (H₂NCO₂NH₄), and ammonium fluoride (NH₄F). ;

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5. A method of reducing toxicity in effluent gases of a gas generator, the gases produced by combustion of a nitrogen-containing gas generant composition and used to inflate an airbag within a vehicle occupant restraint system, the method comprising the step of:

5 inserting a selective non-catalytic reducing compound within the gas generator of a vehicle occupant restraint system, the selective non-catalytic reducing compound in heterogeneous and proximate relation to the gas generant composition and in an amount effective to reduce the concentration of particular toxic gases present in the effluent gases.

6. The method of Claim 5 wherein the gas generant composition is nonazide and produces nitrogen oxides upon combustion whereby the nitrogen oxides are then reacted with decomposition products of the selective non-catalytic reducing compound.

7. A vehicle occupant restraint system comprising an inflatable airbag, a gas generator used to inflate said airbag, a nitrogen-containing nitrogen monoxide-producing and/or nitrogen dioxide-producing gas generant composition for use within said gas generator, wherein said vehicle occupant restraint system further comprises:

a selective non-catalytic reducing compound proximate to and heterogeneously interspersed about said gas generant composition, wherein said selective non-catalytic reducing compound is useful in reducing the nitrogen monoxide and/or nitrogen dioxide produced from combustion of said gas generant composition and is selected from the group consisting of ammonium salts, amine compounds, amide compounds, and imide compounds.

8. A vehicle occupant restraint system of Claim 7 wherein:
said selective non-catalytic reducing compound is selected from the group
consisting of ammonium carbonate $((\text{NH}_4)_2\text{CO}_3)$, ammonium sulfate
 $((\text{NH}_4)_2\text{SO}_4)$, ammonium chloride (NH_4Cl) , ammonium carbamate
 $(\text{H}_2\text{NCO}_2\text{NH}_4)$, and ammonium fluoride (NH_4F) .

9. A vehicle occupant restraint system of Claim 7 wherein:
said selective non-catalytic reducing compound is urea $(\text{H}_2\text{NCONH}_2)$.

10. A vehicle occupant restraint system of Claim 7 wherein:
said selective non-catalytic reducing compound is cyanuric acid $(\text{HNCO})_3$.

11. A method of reducing the amount of nitrogen monoxide
and/or nitrogen dioxide contained in combustion gases of a gas generator used
to inflate an airbag of a vehicle occupant restraint system, wherein the gas
generator comprises a nitrogen monoxide-producing and/or nitrogen dioxide-
producing gas generant composition containing nitrogen, the method comprising
the steps of:

interspersing a selective non-catalytic reducing compound proximate to
and in heterogeneous relationship with the gas generant
composition;

decomposing said selective non-catalytic reducing compound to form
gaseous products;

combusting said gas generant composition to form gaseous combustion
products; and

reacting the gaseous products of the selective non-catalytic reducing
compound with the gaseous combustion products of the gas
generant composition, thereby reducing the nitrogen monoxide
and/or nitrogen dioxide contained in the gaseous combustion
products of the gas generator,

wherein said selective non-catalytic reducing compound is selected from the group consisting of ammonium salts, amine compounds, amide compounds, and imide compounds.

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12. The method of claim 11 wherein:

said selective non-catalytic reducing compound is selected from a group consisting of ammonium carbonate ($(\text{NH}_4)_2\text{CO}_3$), ammonium sulfate ($(\text{NH}_4)_2\text{SO}_4$), ammonium chloride (NH_4Cl), ammonium carbamate ($\text{H}_2\text{NCO}_2\text{NH}_4$), and ammonium fluoride (NH_4F).

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